

PA000457

[1093] WHAT IS CLAIMED IS:

CLAIMS

1. In a wireless communication system, a method for selectively combining a plurality of received transmissions to recover a message comprised of a plurality of frames, the method comprising:

processing each of the plurality of transmissions separately to recover the message; and

if the message cannot be recovered error-free from a single transmission,

determining erased frames in a message recovered from a first transmission,

determining good frames recovered from remaining ones of the plurality of transmissions,

forming at least one combined message, wherein each combined message includes a particular combination of good frames substituting for the erased frames, and

checking each combined message to determine whether it is good or erased.

2. The method of claim 1, wherein the first transmission is one having a highest signal quality among the plurality of transmissions.

3. The method of claim 1, further comprising:

checking each frame in the message recovered from the first transmission; and marking each frame failing the checking as an erased frame.

4. The method of claim 3, wherein each frame is checked based on a set of cyclic redundancy check (CRC) bits generated for the frame.

5. The method of claim 1, wherein each combined message is checked based on a set of cyclic redundancy check (CRC) bits generated for the message.

6. The method of claim 1, wherein a single combined message is formed by

- 2 identifying each erased frame in the message recovered from the first
transmission,
- 4 identifying a good frame, from one of the plurality of transmissions,
corresponding to each erased frame, and
- 6 substituting each erased frame with the corresponding good frame to form the
combined message.

7. The method of claim 1, wherein the good frame corresponding to each
2 erased frame is identified based on a frame number associated with each frame.

- 2 8. The method of claim 1, wherein a plurality of combined messages are
formed by
identifying a plurality of combinations of good frames for the erased frames in
4 the message recovered from the first transmission, and
substituting each combination of good frames for the erased frames to form a
6 respective combined message.

- 2 9. The method of claim 1, further comprising:
if the message cannot be recovered error-free from a single transmission and a
good frame corresponding to a particular erased frame cannot be derived from a single
4 transmission,
combining symbols for two or more frames, from two or more
6 transmissions, corresponding to the erased frame, and
decoding the combined symbols to derive a good frame for the erased
8 frame.

- 2 10. The method of claim 9, further comprising:
if the message cannot be recovered error-free from a single transmission and a
good frame corresponding to a particular erased frame cannot be derived from a single
4 transmission,
ranking the plurality of transmissions, and wherein symbols for frames
6 corresponding to the erased frames are combined in a particular order
determined based on the ranking of the plurality of transmissions.

11. The method of claim 10, wherein the plurality of transmissions are
2 ranked based on their signal quality.

12. The method of claim 9, further comprising:
2 if the message cannot be recovered error-free from a single transmission and a
good frame corresponding to a particular erased frame cannot be derived from a single
4 transmission,
weighting symbols for each of the two or more frames corresponding to
6 the erased frame based on a respective weight determined based on the signal
quality of the two or more transmissions from which the two or more frames are
8 recovered, and wherein the weighted symbols are combined.

13. The method of claim 1, wherein each transmission is from a respective
2 signal source.

14. The method of claim 1, wherein each transmission is a forward link
2 signal from a respective base station in a CDMA system.

15. The method of claim 1, wherein the plurality of received transmissions
2 are approximately synchronous.

16. The method of claim 1, wherein the plurality of received transmissions
2 are asynchronous.

17. The method of claim 1, wherein the message to be recovered error-free is
2 a page message.

18. In a CDMA communication system, a method for selectively combining
2 a plurality of non-synchronous forward link transmissions to recover a page message
comprised of a plurality of frames, the method comprising:

4 processing each of the plurality of transmissions separately to recover the page
message; and

6 if the page message cannot be recovered error-free from a single transmission,
determining erased frames in a message recovered from a first
8 transmission, based on a set of cyclic redundancy check (CRC) bits included
with each frame,
10 determining a good frame, recovered from one of the plurality of
transmissions, for each erased frame,
12 forming a combined message by substituting each erased frame with a
corresponding good frame, and
14 checking the combined message based on a set of CRC bits included
with the message to determine whether it is good or erased.

19. A receiver unit in a wireless communication system, comprising:
2 a demodulator operative to receive and process a plurality of signal instances in
a received signal to provide a plurality of symbol streams, each symbol stream
4 corresponding to a respective received transmission included in the received signal;
a decoder operative to process each of the plurality of symbol streams separately
6 to recover a respective message comprised of a plurality of frames;
a first detector operative to detect each frame in each recovered message as
8 either a good frame or an erased frame;
a second detector operative to detect each recovered message as either a good
10 message or an erased message; and
a frame assembler operative to form at least one combined message, if a
12 message cannot be recovered error-free from a single symbol stream, wherein each
combined message includes a particular combination of good frames substituting for
14 erased frames in the message recovered from a first symbol stream, and
wherein the second detector is further operative to detect each combined
16 message as either a good message or an erased message.

20. The receiver unit of claim 19, further comprising:
2 a frame buffer operative to store good frames recovered from the plurality of
symbol streams.

21. The receiver unit of claim 19, wherein the decoder is further operative to
 2 combine symbols for two or more frames, from two or more symbol streams,
 corresponding to an erased frame, and to decode the combined symbols to derive a good
 4 frame for the erased frame.

22. The receiver unit of claim 21, further comprising:
 2 a symbol buffer operative to store symbols corresponding to each erased frame
 in the message recovered from the first symbol stream.

23. The receiver unit of claim 19, wherein the first and second detectors are
 2 cyclic redundancy check (CRC) checkers.

24. The receiver unit of claim 19, wherein the message to be recovered error-
 2 free is a page message.

25. A terminal in a CDMA system comprising the receiver unit of claim 19.

26. A digital signal processor in a wireless communication system,
 2 comprising:

means for processing a plurality of signal instances in a received signal to
 4 provide a plurality of symbol streams, wherein each symbol stream corresponds to a
 respective received transmission included in the received signal;

6 means for decoding each of the plurality of symbol streams separately to recover
 a respective message comprised of a plurality of frames;

8 means for detecting each frame in each recovered message as either a good
 frame or an erased frame;

10 means for detecting each recovered message as either a good message or an
 erased message; and

12 means for forming at least one combined message, if a message cannot be
 recovered error-free from a single symbol stream, wherein each combined message
 14 includes a particular combination of good frames substituting for erased frames in the
 message recovered from a first symbol stream, and wherein each combined message is
 16 detected to determine if it is a good message.

27. A receiver apparatus in a wireless communication system, comprising:
- 2 means for processing a plurality of signal instances in a received signal to provide a plurality of symbol streams, wherein each symbol stream corresponds to a
 - 4 respective received transmission included in the received signal;
 - means for decoding each of the plurality of symbol streams separately to recover
 - 6 a respective message comprised of a plurality of frames;
 - means for detecting each frame in each recovered message as either a good
 - 8 frame or an erased frame;
 - means for detecting each recovered message as either a good message or an
 - 10 erased message; and
 - means for forming at least one combined message, if a message cannot be
 - 12 recovered error-free from a single symbol stream, wherein each combined message includes a particular combination of good frames substituting for erased frames in the
 - 14 message recovered from a first symbol stream, and wherein each combined message is detected to determine if it is a good message.